

Processing of Polymer-based Nanocomposites: Processing-structure-property-performance relationships: 167-197

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Processing of polymer blends, emphasizing: Melt compounding; influence of nanoparticles on blend morphology and rheology; reactive processing in ternary systems; morphology -property relationships; performance application challenges; and opportunities and future trends

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ABSTRACT:

This chapter discusses the structure-properties of immiscible polymer blends, focusing on the effects of compatibilization. It has been discussed that the morphology of immiscible blends governs their final properties and thus end-use applications. Therefore, refining the morphologies via different routes such as reactive or physical compatibilization methods was suggested. Among the possible compatibilization methods, the use of nanoparticles has recently gained popularity as their large surface areas lend them additional reinforcing characteristics. However, it has been shown that localization of nanoparticles within blends plays a determinant role in refining the blend morphologies. In comparison, nanoparticles located at interfaces exhibit the most efficient contribution to both compatibilization and the blend properties, by acting as a physical shield against coalescence.